



Terrain Instability Assessment and Landslides Control on the Loess Terraces in Lanzhou Region, China

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Disasters arising from terrain instability are frequent in north-west China. The effects of high relative relief, intensive seasonal (monsoonal) rainfall, and active seismicity, together with a considerable thickness (up to 380m) of weakly- or un-cemented wind-lain silts (loess) overlying impermeable argillite, yield a landslide concentration scarcely matched anywhere elsewhere on earth. Due to recent fast economic development and dramatic expansion of human settlements, the terrain instability has become a severe threaten to people's lives and infrastructures. Particularly, the development of both industry and agriculture in the greater Lanzhou region (western margin of the Loess Plateau), over the past forty years has witnessed an intensification and expansion of cultivation on the third and fourth terraces of the Yellow River. This has been possible only at the price of an enlarged and intensified irrigation system, which leads to extensive slope failures and subsidence. The loess, especially the top 20-35m Malan loess (Late Pleistocene Aeolian silts deposit), is characterised with high voids ratio and collapsibility. Given high moisture content, liquefaction may occur along slip surfaces, making the shear strength much lower than the laboratory results tested under normal condition. Therefore instability assessment and remediate work need to be adjusted accordingly from the normal practices. This article presents a case study of the landslide hazards and their assessment and control on a fourth terrace of Yellow River rear Lanzhou.